

# Feeling Your Way to Success Through Journaling

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In this article Shaileigh Page and Julie Clarke explore the use of reflection journals as an important tool to improve student attitudes to mathematics in the primary classroom.

They share some useful ideas that include reflection sentence starters and the use of specific reflection questions.

Perhaps you think it is strange to connect feelings, attitudes and beliefs to mathematics. After all, mathematics is an exact science with right or wrong answers, and it is about being logical and following a formula is it not? Certainly there are elements of mathematics that involve using formulas but it is much more. It is about engaging creatively with patterns, about persisting with problems, and using a range of strategies to solve problems in different contexts. In order to do this, students need to engage deeply with concepts, to develop confidence and to experience real success. An ongoing issue in Western cultures, such as Australia, has been mathematics myths and flawed beliefs including:

- “Only some people are smart enough to do maths”
- “I don’t have a maths brain”
- “Maths is about doing lots of sums and using formulas”
- “You don’t use maths outside of school”.

Students’ feelings, attitudes and beliefs can significantly influence mathematical learning—either positively or negatively (Evans, 2006; McLeod, 1992; Schuck & Grootenboer, 2004). Consequently, these dispositions have been of great interest in mathematics education, specifically patterns of feelings, attitudes and beliefs that foster engagement, concentration interest, persistence and mathematical success. Previous studies have investigated feelings, attitudes and beliefs separately from the

content of the curriculum. *The Australian Curriculum* (National Curriculum Board, 2009), states that it is highly desirable for students to engage with mathematics in ways that develop positive attitudes, beliefs, emotions and values towards the subject.

This paper is part of a larger study where Year 3–5 teachers worked together in a professional learning group and supported one another as they experimented with teaching strategies that highlight these aspects of mathematics learning. The teachers regularly met together (in a professional learning group) to discuss their ideas and experiences with teaching. This study supported a group of teachers to take a more holistic teaching approach to connect feelings, attitudes and beliefs with their teaching. Many teaching approaches were discussed in the professional learning group; some were successful and others were not. This paper will discuss one teaching approach that emerged from the professional learning group: student journaling. It is hoped that this paper will provide practical ideas for teachers to trial in their own classrooms; however, before discussing practical strategies related to journaling, this paper will briefly explore how professional learning groups can support teachers.

### Teachers supporting teachers through a professional learning group

According to Hattie (2009), teachers are the most significant factor in students' learning (outside of demographic factors). Therefore, it is important that teachers are provided with opportunities to develop knowledge and skills in the areas of student beliefs, attitudes and feelings in connection with learning mathematics. Professional learning groups can provide ongoing support for teachers. Groups can be facilitated by an individual or led on a rotational basis by group members.

Ideally, meetings should occur on a regular basis, for example, fortnightly and each meeting should provide some new information about the topic—in this case, the affective domain. For example, group members in this study were given summaries

of educational research on the affective aspects of mathematical learning, or, in other words, beliefs, feelings, attitudes and values. In addition, participants were given time to discuss the information and to develop ways to incorporate the different pedagogies into their teaching. Ideally, each participant will take away something to implement into their teaching and report back outcomes at the next professional learning group.

An example of two professional learning groups can be seen in Table 1.

Table 1. Overview of Professional Learning Groups 1 and 2.

Professional Learning Group 1	Professional Learning Group 2
<ul style="list-style-type: none"> <li>• Summary of educational literature and research               <ul style="list-style-type: none"> <li>– Surveys</li> <li>– Journals</li> </ul> </li> <li>• Discussion</li> <li>• Propose how teaching may change or be improved because of the literature and the strategies presented.</li> <li>• Commit to trying a different teaching strategy before next meeting.</li> </ul>	<ul style="list-style-type: none"> <li>• Follow up discussion related to new strategies               <ul style="list-style-type: none"> <li>– What did you try?</li> <li>– What were the results?</li> </ul> </li> <li>• New summary of educational literature and research and strategies</li> <li>• Discussion about literature and strategies</li> <li>• Propose how teaching may change because of literature</li> <li>• Commit to trying a different teaching strategy before next meeting</li> </ul>

Aside from the professional learning groups, data for this study was also gathered via teacher interviews, journals and researcher observation of participants' classrooms. Data was analysed through the lens of activity theory and stages of concern which, due to page limits of this article, cannot be detailed here. Some strategies teachers have used to help address students' feelings, attitudes and beliefs, as seen in Table 1, include the use of reflection through journals. This strategy is explored in this paper with specific tips and hints along with student examples to paint a detailed picture of how journaling can be used in the primary mathematics classroom.

As teachers were clearly a focus of this study, the following results section is based on teachers' perceptions of journaling and its impact on their students.

## Reflection through student journaling

Journaling was one of many strategies explored by the professional learning group; other strategies included children's literature, maths trails, and the use of games. We have chosen to highlight student journaling because of its success with this group of teachers and students. It should be noted that the aim of this study was not to explore the correlation between journaling and student achievement in mathematics but rather focused on teachers' perceptions of student attitudes, beliefs, emotions and feelings.

It has been well documented how student journals can provide useful insights into students' feelings, beliefs, values and attitudes about mathematics education (Bagley & Gallenberger, 1992; Jurdak & Zein, 1998). This paper reports on five teachers' uses of student journals. One participant stated that "reflection is not an easy thing to do, not to do properly". Therefore, this paper focuses on the strategies these teachers used and specifically highlights the use of:

- brainstorming to build a vocabulary of mathematical reflection;
- sentence starters;
- continuums to represent feelings about mathematics;
- specific questions to prompt student reflection;
- asking students, 'Why?'

This paper will then briefly conclude with the difficulties and benefits of using student journals in mathematics to connect with students' feelings and beliefs. The five teachers had previously used journals in their classes but had stopped for a variety of reasons, including perceived time constraints. Following discussions in the professional learning group about the ways journals could be holistically incorporated into mathematics teaching, the teachers started to use them with renewed enthusiasm.

Five strategies for using student journals in the primary mathematics classroom will now be explored.

## Brainstorming

According to researchers (Barton & Heidema, 2002), brainstorming is a great way to activate students' prior knowledge and for them to begin developing a rich vocabulary to engage in mathematics and reflection about their feelings, beliefs, attitudes and values about mathematics. A Year 3 teacher shared with the professional learning group as to how she used brainstorming to connect students to the affective elements of learning mathematics:

I started off by getting the children to brainstorm all the words they could use to describe maths and their feelings... They then chose a few words that they think describe it. After, we had a discussion about maths and we got some really interesting expressive words (Professional Learning Group 2).

This teacher encouraged students to brainstorm verbally as a group and she wrote down all student responses on the whiteboard. Alternatively, brainstorming could be done in pairs before sharing responses with the whole class or individually in a journal. Collective brainstorming is preferable as students may be exposed to a wider variety of possible vocabulary to help them reflect more deeply.

Two questions the teacher used to guide a general brainstorm are:

1. How could you describe mathematics or the process of learning mathematics?
2. How could you describe how you feel when you learn maths?

Some words that the teachers in this study encountered during the brainstorming sessions in response to the first question included: hard, boring, tricky, easy, fun, challenging and getting the right answers is important. The following words were stated by students in response to the second question: scared, dumb, smart, confident, unsure, stuck, good and challenged.

The brainstorm is useful to gain insight into students' perceptions about mathematics

in general but is equally beneficial to gain insight into students' perceptions about a specific mathematics lesson. Another important aspect of the brainstorm is to develop students' vocabulary of words that will help them to describe how they are feeling when they begin to write in their mathematics journal.

## Sentence starters

Sentence starters were an important second step in encouraging students to journal about their feelings, attitudes, beliefs and values because students "need a structure at this age to be able to reflect and they need to be able to do it often" (Year 3 teacher, Interview 3). The teachers gave all the students in their classes the same question to respond to in their journals. They discovered this was a relatively quick way to gain insight into students' affective dispositions. Often students would write a journal entry at the end of mathematics lessons which included the date, the sentence starter and their response. The following are examples of sentence starters used by the teachers:

- Today in maths I enjoyed...
- Today in maths I found ... challenging.
- I want to learn more about...
- Today in maths I learned about... and I felt...
- In maths today I felt... because...
- When I count up by tens, beginning at zero, I feel...
- When I count down by 10, beginning at 500, I feel...

Sentence starters can elicit students' feelings, beliefs, attitudes and values about mathematics in general or about a specific mathematics skill, as in the last two examples. One teacher said that when she uses sentence starters, "I try to stick to the positives and gaining information about their learning and how they see themselves as learners" (Year 3 teacher, Professional Learning Group 2).

## Continuums

One teacher used a continuum of feelings as something the students could explain and reflect on in their journals. This Year 3 teacher explained to the professional learning group: "I've asked children to rate their thinking and their feelings on a continuum and then to do a follow up [explanation in their journal]. The follow up is for when they finish each lesson," (Interview 3). Sentence starters were often used in partnership with the continuum. The following is a continuum that could be used in the primary mathematics classroom.

You can use this continuum to ask students to represent their feelings by colouring one of the faces or placing a mark somewhere in between. Alternatively, you can use numbers or other symbols to create a continuum to represent feelings about mathematics.

## Asking specific questions

Asking questions where the emphasis is on students' feelings is a key aspect of this strategy, along with exploring students' beliefs about the nature of mathematics. The following three examples demonstrate the power of asking specific questions about students' mathematical beliefs and feelings.

### How do you use maths when you're not at school?

Two Year 5 teachers asked their students: "How do you use maths when you're not at school?" as they suspected their students believed that mathematics was limited to school, specifically within the classroom. The answers in their students' journals confirmed it. "I use it for homework" was a common answer among their shared class of 10 year-olds. In response to these student beliefs, the teachers focused their teaching on numeracy and connecting their learning to students' everyday lives. This in turn resulted in a much deeper level of understanding in mathematics and even made mathematics more relevant to many students' lives, contributing to greater levels of enjoyment and engagement.

## How do you feel about your understanding of the maths we are learning at the moment?

A Year 5 teacher asked this question of her students. She shared one student's poignant response with the professional learning group: "I do enjoy maths at the moment but sometimes my questions don't get answered, so I don't understand what's going on" (Professional Learning Group 2). This journal entry was encouraging to this teacher because it showed the student's enjoyment and provided tips on how to increase that enjoyment: by focusing on answering her questions.

Accordingly, the Year 5 teacher summarised this strategy perfectly: "It's about asking good questions... all they have to do is write a couple of sentences" (Professional Learning Group 6).

### Why?

'Why?' is arguably the most significant question to elicit from student journals. One teacher stated:

As a result of being in this project ... reflecting on how you felt and why [is important] ... I've started using it all the time, even when things went really bad [during a lesson], let's see what they're saying about it, two or three sentences is all I need (Year 5 Teacher, Professional Learning Group 7).

Teachers in the study asked, "How do you feel and why?" at the end of most lessons; however, one Year 3 teacher asked these questions throughout the lesson, approximately every 15 minutes. Although this strategy interrupted the mathematical learning, he described it as "quick" and "very short" which resulted in more detail about students' feelings and the cause of those feelings. Another teacher stated: "just one sentence on how you're feeling and why ... and they just write ... their success has been much greater" (Year 5 Teacher, Professional Learning Group 7).

## Journaling: Difficulties and benefits

Some students have difficulty writing and expressing their thoughts on paper. In these cases, reflection does not have to be done through journaling. Other alternatives may include reflection through:

- talking/class discussions
- painting and/or drawing pictures
- video diaries.

Although writing is a potential difficulty, none of the teachers had any complaints from their students. Many suggested that students felt valued and better cared for because their teacher was interested in hearing about and responding to their feelings, beliefs and attitudes towards mathematics.

Time constraints were also identified as a potential difficulty related to journaling. The school day is packed full with lessons, assemblies and other special events and it is therefore understandable that keeping student journals can slip off the radar. There are many benefits of journaling, however: increased knowledge of students interests, attitudes and beliefs, leading to a more effective and engaging mathematics classroom. Ultimately of course the aim is to improve learning outcomes for the students.

Journaling and the information gained from this strategy proved to be beneficial and useful for:

- parents wanting updates on their child's academic development in mathematics;
- teachers:
  - during report writing;
  - during lesson planning as they gained instant feedback from the students and guided what they need to focus on in future lessons;
- students, as a bench mark for themselves (and their teachers) to reflect on throughout the year;
- addressing the myths students bring into the classroom and tackle them 'head on';
- raising awareness of feelings, beliefs, attitudes and values for both students and teachers.

Overall, using the strategies outlined in this paper will provide teachers with the



knowledge and the practicalities of using student journaling to gain insight into students' affect and mathematical thinking. The teachers in this study felt that the students were "very good at telling us what they think and feel" and that "the best tools are the children" (Professional Learning Group 8). Many found that "the more the kids know themselves and understand how they're feeling... the more willing they are to risk take and be challenged" (Interview 3). Much "better results" in mathematics were evident in all classes with some of this success being contributed to student journaling and raised awareness of the affective elements of mathematical learning.

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